The tendency toward English-language papers in MEDLINE

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In a recent Brief Communication in the *Bulletin of the Medical Library Association,* Guardiola and Banos concluded that the presence of papers published in languages other than English had receded in the last decade [1]. However, figures supporting this assertion were not presented systematically over time. The purpose of the study described here was to determine annual changes in the proportion of English-language papers indexed in MEDLINE during the period from 1984 through 1994. The results provide detailed evidence that the proportion of English-language papers indexed in MEDLINE increased from 75.3% to 86.3% of all papers indexed during the eleven-year period. This increase reflects the growing number of biomedical sciences researchers in non-English-speaking countries who publish their scientific findings in English.

METHODS

Searches of the MEDLINE database on CD-ROM (SilverPlatter) were conducted to quantify the total number of papers published in nine languages (Chinese, English, French, German, Italian, Japanese, Polish, Russian, and Spanish) from 1984 through 1994 (Table 1). To establish a baseline against which to compare recent trends, the authors also tracked the total number of papers published in those languages during the period from 1966 to 1976. The number of periodicals and the total number of papers published in countries whose journals were indexed by *Index Medicus* were also calculated to provide a basis for determining the percentage of English-language papers among all papers during the same period.

RESULTS

As Table 1 shows, the percentage of English-language papers climbed steadily from 75.3% to 86.3% during the eleven years studied. There has been a dramatic increase in this percentage since 1966. In contrast, the share of papers published in Russian decreased 3.4% during the eleven years, and similar declines were observed for other languages: German, 2.5%; Japanese, 1.4%; French, 1.3%; Italian, 0.9%; Polish, 0.6%; and other languages, 1.7%. If the trends are observed beginning in earlier years, such as 1966 or 1976, then the declines are even more precipitous.

Turning to the number of periodicals indexed in *Index Medicus* by publishing country, the total for Germany fell from 273 in 1984 to 235 in 1994, France from 98 to 87, the former Soviet Union from 77 to 66, Italy from 90 to 82, Poland from 50 to 44, and Japan from 120 to 118. The reverse trend was observed in China, where the number of periodicals indexed rose from 23 to 30, and in Spain, where the number rose from 24 to 30. However, the number of English-language papers published in those countries also increased by a comparable number.

Table 2 shows that the proportion of English-language papers published in Germany increased from 53.8% to 67.9% of the total number of papers indexed by MEDLINE from 1984 through 1994, and the percentage published in Italy increased from 32.5% to 51.8% of all papers indexed during the same period. The percentages for Poland, Japan, and France also grew appreciably, while the change in Spain and China was more gradual. The former Soviet Union was excluded from Table 2 because of its low rate of dissemination of English-language papers during the decades studied.

DISCUSSION AND CONCLUSION

The results indicate the increasing tendency for biomedical sciences researchers in non-English-speaking countries to publish their scientific findings in English-language publications. One possible explanation for this trend is international collaboration. Arunachalam et al. [2] and Melin and Persson [3] have found that researchers in France, Italy, and China have published more collaborative papers with authors in the United States, United Kingdom, and Canada. The newsletter *Science Watch* [4] tracked multinational coauthorship and found that papers published in France (26.7% of all papers), Italy

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Table 1
Distribution of papers indexed in MEDLINE by language

Years	English (%)	Russian (%)	German (%)	French (%)	Japanese (%)	Italian (%)	Polish (%)	Spanish (%)	Chinese (%)	Other (%)
1994	86.34	1.86	2.32	2.35	2.25	0.74	0.46	1.17	0.75	1.76
1993	85.03	2.10	2.55	2.48	2.24	0.74	0.52	1.28	0.82	2.24
1992	84.31	2.39	2.61	2.53	2.34	0.85	0.54	1.38	0.82	2.23
1991	81.88	3.94	3.33	2.65	2.21	1.09	0.40	1.39	0.79	2.32
1990	79.54	4.38	3.88	2.84	2.56	1.24	0.50	1.48	0.83	2.75
1989	77.97	4.58	3.90	3.03	3.16	1.27	0.61	1.58	0.86	3.04
1988	77.58	4.77	3.88	3.12	3.17	1.28	0.84	1.48	0.95	2.93
1987	77.13	4.90	4.00	3.10	3.28	1.35	0.91	1.38	0.95	3.01
1986	76.39	4.92	4.12	3.36	3.34	1.45	0.92	1.36	0.99	3.15
1985	75.70	5.17	4.23	3.50	3.62	1.51	0.90	1.33	1.00	3.04
1984	75.28	5.25	4.15	3.66	3.51	1.63	1.09	1.33	0.86	3.24
1976	68.24	7.24	7.70	4.53	2.43	1.79	1.76	1.26	0.04	5.01
1966	53.45	8.44	10.90	7.71	3.87	5.23	2.44	1.95	0.06	5.95

(26.6%), Germany (25.5%) and Japan (13.1%) posted high levels of international coauthorship, and that researchers in Poland and China also exhibited high rates of collaboration with foreign authors. Hicks and Katz [5] found that in the United Kingdom the number of papers published by multiple authors from one country had increased by about 10%, while the number published by multiple authors from two or more countries had increased by 2%.

A second explanation for the dominance of English-language papers is the magnifying effect of citations and the high impact factors of international and English-language periodicals. Meneghini [6] showed that when the papers of Brazilian biochemists were published in internationally known periodicals, they had received an average of 7.2 citations each, whereas when the biochemists' papers were published in Brazilian periodicals, they garnered fewer citations. Butler [7] found that French scientific periodicals published either partially or totally in English had an impact factor 3.5 times higher than that of publications using French only. Yamazaki [8] suggested that Japanese researchers tended to contribute their best papers, particularly those dealing with basic rather than applied research, to international periodicals because the Japanese-English periodicals had much lower impact factors. Ashoor and Chaudhry [9] also indicated that researchers in developing countries preferred to publish in English in foreign periodicals.

A third explanation is the perception of authors that contributions in English enjoy wider international recognition and are more readily accepted by journal editors.

An analysis of the MEDLINE database has suggested that the number of English-language papers is increasing and that such papers have growing intranational and international currency in biomedical communication. This indicates a need for further study focusing on the language gap between non-English-language papers and English-language papers indexed in MEDLINE and *Index Medicus*.

Table 2
Percentages of English-language papers indexed in MEDLINE from periodicals published in seven countries

	Country of publication													
	Germany		Japan		France		Italy		Poland		Spain		China	
Years	No. of papers	Papers in English (%)	No. of papers	Papers in English (%)	No. of papers	Papers in English (%)	No. of papers	Papers in English (%)	No. of papers	Papers in English (%)	No. of papers	Papers in English (%)	No. of papers	Papers in English (%)
1994	22,515	67.93	13,809	37.71	8,680	17.58	5,530	51.77	2,387	26.27	3,687	11.74	3,287	15.88
1993	22,988	67.02	13,661	37.43	9,250	20.02	5,858	53.43	2,682	25.45	3,863	10.01	3,457	14.41
1992	23,518	66.57	14,772	40.36	9,359	18.93	6,211	49.48	2,771	26.81	4,206	9.93	3,341	13.38
1991	25,171	59.68	13,570	38.93	9,917	19.41	7,205	44.15	2,047	27.02	4,019	9.93	3,193	13.40
1990	27,947	55.69	15,123	36.27	10,247	16.36	7,726	40.78	2,451	22.52	4,098	8.44	3,411	13.60
1989	27,837	56.25	17,093	31.59	10,346	13.96	7,732	39.30	2,882	22.24	4,356	9.32	3,442	13.74
1988	26,847	56.32	16,366	31.49	10,257	14.90	7,446	39.18	3,601	17.05	3,554	9.06	3,555	13.19
1987	25,714	55.41	15,969	31.81	9,656	13.78	7,750	41.59	3,686	16.74	3,153	9.13	3,401	13.52
1986	24,762	54.16	15,740	31.99	9,620	13.25	7,345	36.58	3,520	16.22	2,863	9.05	3,480	13.22
1985	23,973	53.39	16,213	31.36	9,577	12.62	7,077	34.53	3,371	17.92	2,648	7.78	3,266	10.87
1984	22,908	53.81	15,281	31.71	9,838	13.80	7,200	32.49	3,809	14.96	2,599	8.50	2,834	12.07
1976	24,436	32.70	8,800	33.08	9,708	11.08	5,466	19.37	5,267	17.20	1,548	4.59	62	100.0
1966	17,193	8.22	8,869	23.32	10,325	2.00	9,656	4.48	5,018	13.81	974	1.33	126	53.97

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